

CLAIMS

What is claimed is:

1. A method for calculating an optimal route from a first location to a second location along a road network located in a geographic region using a geographic database that represents the road network, wherein the optimal route has a characteristic optimized for a specific criterion, the method comprising the steps of:

with a relatively fast algorithm optimized for the criterion, determining a trial route from the first location to the second location using the geographic database,

determining a boundary value for the characteristic, wherein the boundary value is that value by which the characteristic of the trial route meets the criterion; and

from all possible routes between the first location and the second location that have a value for the characteristic that is less than the boundary value, selecting as the optimal route that route that has an optimal value for the characteristic.

2. The method of claim 1 wherein the characteristic is travel time and the specific criterion is least travel time.

3. The method of claim 1 wherein the characteristic is distance traveled and the specific criterion is least distance traveled.

4. The method of claim 1 wherein the characteristic is travel and distance and the specific criterion is speed.

5. The method of claim 1 wherein if one of the subsequent route calculations has exceeded the boundary value, the route calculation is stopped to pursue a potentially better route at a different location.

5 6. The method of claim 1 wherein the algorithm is one of the A* algorithm and the Dykstra algorithm.

7. A route calculation program for use in a navigation system, the route calculation program adapted to calculate an optimal route from a first location to a second location along a road network located in a geographic region using a geographic database that represents the road network, wherein the optimal route has a characteristic optimized for a specific criterion, the route calculation program comprising the steps of:

 determining a bounding route between the first location and the second location by selecting segments of roads that have characteristics that best satisfy a criterion;

 determining a boundary value by assessing the characteristics of each selected segment of road of the bounding route; and

 selecting the optimal route that has an optimal value for characteristics of all subsequent route calculations that have a value for the characteristic that is less than the boundary value.

20 8. The invention of claim 7 wherein the characteristic of each segment is travel time and the criterion is least time traveled.

9. The invention of claim 7 wherein the characteristic of each segment is distance traveled and the criterion is least distance traveled.

10. The invention of claim 7 wherein the boundary value is optimized for the criterion.

5

11. A method for calculating an optimal route from a first location to a second location along a road network located in a geographic region using a geographic database that represents the road network, wherein the optimal route has a characteristic optimized for a specific criterion, the method comprising the steps of:

10 with a relatively fast algorithm optimized for the criterion, determining a boundary route from the first location to the second location using the geographic database,

determining a boundary value for the characteristic, wherein the boundary value is that value by which the characteristic of the boundary route meets the criterion; and

15 performing an exhaustive search of all possible routes between the first location and the second location that have a value for the characteristic that is less than the boundary value, selecting as the optimal route that route that has an optimal value for the characteristic.

12. The method of claim 11 wherein a node stack is generated to prioritize searched nodes and previously un-searched segments associated with the searched nodes.

20

13. The method of claim 12 wherein the node stack permits the algorithm to "back-up" to a node listed on the node stack.

14. The method of claim 11 wherein the exhaustive search comprises searching only those routes on a specific layer.